Small Business Innovation Research/Small Business Tech Transfer

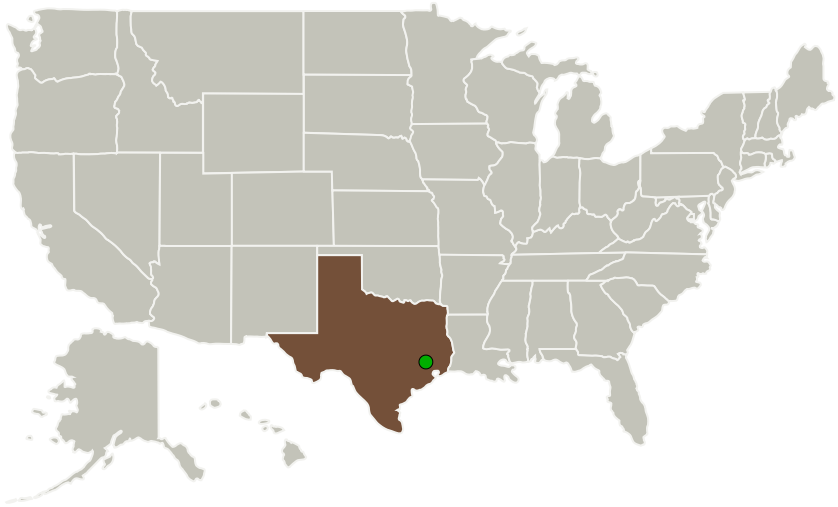
Model-Based Fault Management Engineering Tool Suite, Phase II

Completed Technology Project (2015 - 2019)

Project Introduction

NASA's successful development of next generation space vehicles, habitats, and robotic systems will rely on effective Fault Management Engineering. Our proposed innovation aims at developing a method and associated tool suite to support Model-Based Fault Management Engineering (MBFME) for these upcoming projects. Our goal is to leverage Model-Based Systems Engineering (MBSE) concepts, and adapt them to Fault Management (FM). Model-Based Fault Management Engineering is proposed to be the formalized application of modeling to support Fault Management Engineering activities. Traditional approaches to fault management are costly, difficult to execute, and are largely decoupled from the main system engineering activities which aim to capture the system requirements and transform them into a robust and safe design. Our concept will enable the integration of fault management early in the system engineering lifecycle, facilitating the discovery of design weaknesses and enhancing the capability to produce safe, hazard-free systems. This tool suite will enable safety engineers to use system models captured by system engineers to evaluate designs for potential faults, perform safety analyses, and contribute to the overall system models by adding specific faults and associated safety related knowledge.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations

Texas

Project Transitions

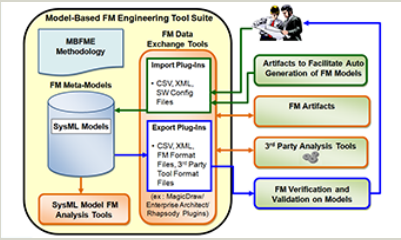
May 2015: Project Start

April 2019: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137525)*

Images



Briefing Chart
Model-Based Fault Management Engineering Tool Suite Briefing Chart *(https://techport.nasa.gov/image/129283)*

Project Management

Program Director:
Jason L Kessler

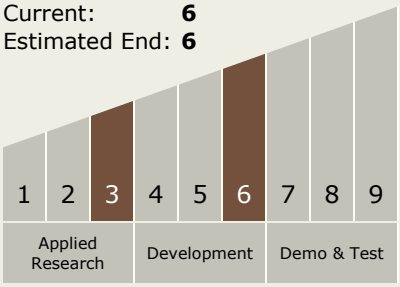
Program Manager:
Carlos Torrez

Principal Investigator:
Ken Mcmutrie

Co-Investigator:
Michel Izygon

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.1 Software Development, Engineering, and Integrity
    - TX11.1.4 Operational Assurance

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Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System